



NATIONAL ACTION PLAN ON BREAST CANCER  
A Public/Private Partnership

W O R K I N G G R O U P

JANUARY 1999

THE BREAST CANCER ETIOLOGY WORKING GROUP

Understanding the etiology, or causes, of breast cancer is critical to understanding how to prevent the disease from ever occurring and to improving treatment. Scientists know that independently and in combination, genetic, biologic, environmental, and lifestyle factors all may contribute to the initiation of breast cancer.

WHAT IS THE NAPBC?

The National Action Plan on Breast Cancer (NAPBC) was established in 1993 in response to a National Breast Cancer Coalition petition signed by 2.6 million people and presented to President Clinton. The petition called for a coordinated national strategy to combat breast cancer, the second leading cause of cancer deaths among American women.

The mission of the NAPBC is to stimulate rapid progress in eradicating breast cancer. The strategy for the Plan is to:

- *encourage new ideas and define unaddressed breast cancer priority areas.*
- *serve as a catalyst for national efforts to advance breast cancer knowledge, research, policy, and services.*
- *mobilize partnerships and coordinate actions among diverse public and private sector organizations and individuals.*

The work of the NAPBC is guided by a Steering Committee and Working Groups. The Steering Committee provides oversight for and ensures coordination across NAPBC initiatives. The Working Groups correspond to Plan priorities and identify, recommend, and oversee implementation of Plan activities. Plan implementation is coordinated by the U.S. Public Health Service's Office on Women's Health. Currently, there are five Working Groups. This fact sheet describes the Breast Cancer Etiology Working Group.

Inherited factors, such as mutations of the BRCA1 and BRCA2 genes, account for only about 5 to 10 percent of breast cancers. Individuals with a family history of breast cancer are known to be at increased risk of developing the disease, and this likely reflects a genetic predisposition.

Hormones, such as estrogens and androgens, have varying effects on the growth of breast tissue and have been associated with the development and progression of breast cancer. Reproductive factors, such as age at first full pregnancy, age at menarche and initiation of menopause, number of live births, and the spacing between births, appear to influence breast cancer risk because of their effects on a woman's hormonal status. Hormones such as those used in oral contraceptives and estrogen replacement therapy also are being studied to clarify what, if any, relationship they have to breast cancer in certain subgroups of women.

Environmental factors, such as exposure to ionizing radiation, have been shown to cause cancer by reacting with a gene's DNA and causing a mutation. The risks increase with higher levels of radiation exposure and with exposures at younger ages.

Lifestyle factors such as diet and exercise also are emerging as potential factors in the development of cancers, including breast cancer. Much less is known about the possible role of viruses, low-level radiation, electromagnetic fields and light-at-night, chemicals, and gene-environment interactions in the development of breast cancer.

The Breast Cancer Etiology Working Group of the National Action Plan on Breast Cancer (NAPBC) is working to expand the scope of biomedical research activities related to the causes of breast cancer, particularly in the areas of chemicals and hormones, ionizing and nonionizing radiation, lifestyle factors, viruses, and gene-environment interactions.

## CURRENT ACTIVITIES AND ACCOMPLISHMENTS

The Breast Cancer Etiology Working Group has moved forward on a number of fronts. In keeping with the Plan's emphasis on identifying emerging issues of particular concern in breast cancer, the Working Group has formed subcommittees on chemicals and hormones, personal and lifestyle risk factors, radiation and electromagnetic fields, viruses, multicultural aspects of breast cancer etiology, and issues related to existing geographic differences in cancer incidence rates.

### WORKING GROUP ACCOMPLISHMENTS

*Convened workshops to explore several aspects of breast cancer etiology. Workshop findings have been or will be submitted to scientific journals for publication.*

*Workshops included:*

- *Workshop on Early Life Exposures and Risk of Breast Cancer*
- *Workshop on Electromagnetic Fields, Light-At-Night, and Human Breast Cancer*
- *Workshop on Medical Ionizing Radiation and Human Breast Cancer*
- *Workshop on Physical Activity and Breast Cancer (workshop summary and papers were published in a supplement to Cancer).*
- *Workshop on Viruses and Human Breast Cancer: Exploring the Links*
- *Workshop on Hormones, Hormone Metabolism, Environment, and Breast Cancer (proceedings were published in Environmental Health Perspectives).*

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*Developed a standardized questionnaire on factors that may be linked to breast cancer for use by researchers in collecting data from study participants.*

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*Developed and posted on the NAPBC Web site a list of State and Federal resources for information on local breast cancer rates and on geographical areas in which there are elevated rates of breast cancer incidence.*

In 1998, the Working Group prepared and disseminated findings and recommendations from workshops on groundbreaking areas of breast cancer research. It also completed several projects to further research and education related to breast cancer and began planning workshops on exciting new research topics. New areas of exploration include the possible effects of early life exposures and of tissue architecture on the development of breast cancer.

#### **Research Priorities Related to Early Life Exposures and Risk of Breast Cancer**

The Working Group convened the Workshop on Early Life Exposures and Risk of Breast Cancer on January 20 and 21, 1999. The workshop brought together consumers, cancer epidemiologists, and those with expertise in maternal and child health and prenatal carcinogenesis to discuss the current state of knowledge concerning perinatal exposures and breast cancer. In addition, the workshop focused on areas that presently are being studied, possible mechanisms, and the direction of future research. The Working Group is preparing a summary of workshop presentations and recommendations for publication.

#### **Research Priorities Related to Electromagnetic Fields, Light-At-Night, and Human Breast Cancer**

In November 1997, the Working Group convened the Workshop on Electromagnetic Fields, Light-At-Night, and Human Breast Cancer to examine the foundations for and implications of the possible effects of electromagnetic fields and light-at-night on increased risk of breast cancer in industrial societies. The Working Group prepared a workshop summary and a final report from an advocacy perspective, which present recommendations for educating the public on the possible risks associated with electromagnetic fields and light-at-night, taking prudent avoidance measures, and advancing research in this area. Both documents are available on the NAPBC Web site (<http://www.napbc.org>).

### **Research Priorities Related to Medical Ionizing Radiation and Human Breast Cancer**

Immediately preceding the electromagnetic fields workshop, the Workshop on Medical Ionizing Radiation and Human Breast Cancer brought together scientists and advocates to discuss research on the effects of medical ionizing radiation on breast cancer. Workshop participants identified subgroups most vulnerable to ionizing radiation and developed strategies to reduce risk and minimize unnecessary exposure. The Working Group prepared and posted on the NAPBC Web site a summary of workshop presentations and the advocates' conclusions and recommendations from the workshop. These documents provide information on what is known and suspected about the effects of medical ionizing radiation, and they present recommendations for future research, education, and policy.

### **Research Priorities Related to Physical Activity and Breast Cancer**

Also in November 1997, the Working Group convened the multidisciplinary Workshop on Physical Activity and Breast Cancer to examine the current state of knowledge about the relationship between physical activity and breast cancer, to explore the limitations of current studies, and to determine what can be applied to breast cancer research from physical activity studies in other health areas. The workshop was cosponsored by the American Cancer Society, the Susan G. Komen Breast Cancer Foundation, and the U.S. Public Health Service's Office on Women's Health. The Working Group published a summary and papers resulting from the workshop in a supplement to *Cancer* (83 [Suppl 3], 1998). The papers examine the epidemiologic evidence for an association between physical activity and the risk of breast cancer, review the methods used to assess this correlation, and present recommendations for improving these methods and for future areas of investigation. The full workshop summary can be viewed on the NAPBC Web site.

### **Research Priorities Related to Viruses and Human Breast Cancer**

In March 1997, the Working Group convened the Workshop on Viruses and Human Breast Cancer: Exploring the Links to bring together clinical and basic researchers and consumers to discuss what is known and what is suspected about virus-associated breast cancer and to identify areas for future collaboration and research. The Working Group has disseminated letters to major government funding agencies and to several nonprofit cancer organizations regarding the workshop's research recommendations. These recommendations are available on the NAPBC Web site.

### **Research Priorities Related to Hormones, Hormone Metabolism, and the Environment**

The Workshop on Hormones, Hormone Metabolism, Environment, and Breast Cancer, cosponsored by the National Cancer Institute and Tulane University, was held in September 1995. It brought together the nation's top researchers, government officials, and breast cancer survivors to discuss emerging concepts, identify unmet needs and unexplored issues, and recommend priorities for future research. A summary of the workshop proceedings and recommendations was published as a supplement to *Environmental Health Perspectives* (105 [Suppl 3], 1997), and research priorities identified by meeting participants were published in the *Journal of the National Cancer Institute* (90[1]:67, 1998).

### Comprehensive Questionnaire on Risk Factors

The Working Group has developed the Breast Cancer Comprehensive Questionnaire to improve the availability, quality, and comparability of data on risk factors for breast cancer that are gathered from current and future studies. The questionnaire, which is designed to provide researchers with a standardized set of questions on environmental factors linked to breast cancer, includes short and long core questionnaires, six modules, an interviewer's manual, and illustrative show cards. The questionnaire modules capture information on sociodemographic and cultural factors, medical and reproductive history, food and nutrition, environmental exposures, occupational history, and personal and lifestyle choices. All the components of the questionnaire will be made available on the NAPBC Web site.

### State and Federal Resources for Breast Cancer Incidence and Mortality

The Working Group completed and placed on the NAPBC Web site a new product, State and Federal Resources for Breast Cancer Incidence and Mortality Data. On this section of the Web site, users can access contact information for State and Federal resources that provide data on local breast cancer rates and examine geographical areas in which there are elevated rates of breast cancer incidence.

#### FOR MORE INFORMATION

For more information about the Breast Cancer Etiology Working Group and its activities, please contact:

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#### FUTURE PLANS

The Working Group is continuing to focus on several key themes:

- identifying emerging concepts and issues in breast cancer etiology.
- bringing together a diverse array of experts to explore these emerging issues, share research findings, and chart future research directions.
- catalyzing others to take action by focusing attention on priority issues, forging partnerships with diverse individuals and organizations, and urging action when warranted by research evidence.

In 1999, the Working Group also will convene two workshops. On March 17 through 19, the Workshop on Multicultural Aspects of Breast Cancer Etiology will bring together individuals from varied disciplines, including members of the breast cancer research and

minority health advocacy communities, to examine the current state of knowledge concerning the multicultural aspects of breast cancer etiology, explore the limitations of and gaps in current research, and identify and prioritize future research directions. This workshop is being cosponsored by the Susan G. Komen Breast Cancer Foundation, the Mayo Clinic, the U.S. Department of Defense, the National Cancer Institute, the Office of Research on Women's Health of the National Institutes of Health, the U.S. Public Health Service's Office on Women's Health, and the American Cancer Society. The Working Group is preparing a literature review, a bibliography, and a report on current research activity in preparation for the workshop and anticipates publishing a journal supplement that will include papers by workshop speakers and research recommendations.

A workshop on the role of tissue architecture in the development of breast cancer will be held September 15 and 16, 1999. It will bring together consumers and researchers to examine current information and hypotheses related to this topic and to identify areas for further research.